known part of the Delta (Forcados to the Nun), the negroes of the Niger mouths and their accessory streams are now arranged in the following ethnic groups. Beginning on the west, the Edo or Benin peoples, treated of in the book under review; the Jekri on the south or south-west of these; the Ijō, south-east of the Edo (Sobo), and especially in the eastern part of the main delta, between the Nun mouth and Opobo; the Ibo, north of the Ijō; the Arō ruling caste (almost semi-Caucasian in their physiognomy and skin-colour), between the Ibo and the Cross river; and the semi-Bantu Kwō and Akwa tribes between the Opobo and the Efik people of Calabar. Some of the Arō men and women resemble the Fula in their clear-cut, delicate profiles, their thin, well-formed lips, and lithe, finely-shaped bodies; and (as already remarked) there are savages from the western part of the delta, which, to the reviewer, seemed of an exceptionally low and brutal type.

The Edo-speaking people of the ancient kingdom or confederation of Benin are mainly the subject of Mr. Northcote Thomas's monograph, though allusions to and some comparisons are made with certain of the other tribes of the Delta and with the Yoruba of Lagos hinterland. Linguistically and racially the Edo group seems to be allied to the Yoruba and also to the E'we family (of Dahome). Their somewhat remarkable civilisation (like that of the Arō and Efik to the east and south, so strikingly superior to the barbarity of the Ijō and Kwō) has come to them from the north and north-east, and may perhaps be traced back to the Songhai culture of mediæval Nigeria.

Mr. Thomas has very little to say about the bronze-casting which has made the culture of Benin famous in ethnology. It seems to have died out almost entirely amongst the Edo people of to-day, who confine themselves to forging brass and iron ornaments and implements.

The work under review deals in part i. first with the affinities of the Edo people and the surrounding tribes, so far as there are any. Then comes a brief sketch of the Edo speech, followed by ethnological notes on this people, between pp. 11 and 123; an appendix on the pronunciation of the Edo speech, together with sample vocabularies for filling up by other inquirers. Also there is an interesting appendix on genealogies and terms and degrees of kinship; and another on suggestions, for other anthropologists, as to the best procedure in photographing African peoples. (Though not without interest these appendices on linguistics and on photography are disappointing to the already trained ethnologist, who expects Mr. Thomas's book to be entirely filled with the results of his own researches.) Part ii. contains (*a*) a number of interlineally translated texts to illustrate the Edo, Ishan, Kukuruku (and numerous dialects), and Sobo languages; (*b*) a grammar of the Edo (Bini, Benin) language; (*c*) a comparative dictionary of the Edo languages and dialects; and (*d*) an Edo-English dictionary.

The index comes near the end of the first part, and is singularly poor and inadequate. It is strange that this should be so in a work which is sufficiently good and important to merit very full indexing. For it may be said without more ado that Mr. Northcote Thomas's study of the Edo-speaking people will take a prominent place in ethnological works dealing with the negro. It is all first-rate, first-hand information, and errs only by omission and not by commission. Particularly valuable are the sections dealing with religion and magic; with marriage and birth customs; with native law and trial by ordeal; and the notes on the native calendar. The texts taken down from the many native informants not only exhibit the exact structure of the different languages, but illustrate very effectively the subject-matter of negro stories, the somewhat gross indecency of speech in regard to certain legends, and in general the outlook on the world around them of negroes that have hitherto been almost entirely uninfluenced by the modern European.

In arranging the English version in his comparative dictionary, Mr. Thomas should have invited the assistance of someone acquainted with African zoology. There are no "pheasants" or "crow pheasants" in Africa, and no "badgers." H. H. JOHNSTON.

COLOUR AND CONSTITUTION.

Die Beziehungen zwischen Farbe und Konstitution bei organischen Verbindungen. By Prof. H. Ley. Pp. viii+246+Taf. ii. (Leipzig: S. Hirzel, 1911.) Price 7 marks.

MANY chemists will welcome Prof. Ley's work on the relations existing between selective absorption and constitution in the case of organic compounds. The subject has attracted considerable attention of late years, and probably more definite conclusions would have already been reached had physicists rather more knowledge of organic chemistry and organic chemists a better acquaintance with physical conceptions.

The work is divided into two parts, 204 pages being devoted to the subject indicated in the title, whilst the remainder of the book deals with the methods of spectroscopic work. Prof. Ley insists at an early stage on the necessity of making no distinction in kind between selective absorption in the visible and ultra-violet regions of the spectrum, and proceeds to a consideration of Beer's law, "extinction-coefficient," and the influences, such as concentration, solvent, and temperature, which cause variation in absorption spectra.

In dealing with the different theories which have been proposed to account for the colour of organic compounds, Prof. Ley starts with the early efforts of Graebe and Liebermann and of Witt, and divides the chromophors into eight groups. One cannot fail to be struck with the universal existence of conjugated double linkages in compounds which show selective absorption, though in the ketenes chromophoric properties seem to be associated with adjacent double linkages. The triple linkage, on the other hand, seems to have little effect, and benzoylphenylacetylene is a colourless compound. The quinonoid constitution of many coloured compounds and H. Kauffmann's more recent development of the auxochrome theory are then discussed, whilst considerable attention is devoted to the influence of the solvent and

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the variation of the position of absorption bands which is likely to be produced by association of solvent with solute. Due recognition is given to the importance of the work now being carried out by Purvis on the selective absorption of substances in the state of vapour, in which case the influence of solvent is quite eliminated.

Considerable interest attaches to the attempted physical explanation of selective absorption, and use is made of the mass of experimental material accumulated by Hartley, Baly, and others. Baly's idea of "isorropesis" does not commend itself to the author, who is in favour of an electronic theory.

As may be expected in a book written in the Leipzig laboratory, much attention is given to the quinonoid rearrangement frequently assumed when a change in colour accompanies salt formation. One might gather from this portion of the work that "chinoide Umlagerung" was specially associated with Leipzig; *e.g.* on p. 169 one finds regarding phenolphthalein :—

> "Der Beweis, dass den Salzen chinoide Konstitution zukommt, beruht auf der Existenz zweier verschiedener Äther. Neben dem farblosen laktoiden Dimethyläther existiert ein roter chinoider Äther, der zuerst von Green und King dargestellt und eingehend auch von K. H. Meyer und Hantzsch, untersucht wurde."

One would scarcely realise the great importance of Prof. Green's work on the phthaleins by reading this passage; and it may be pointed out (see pp. 176–7) that the hydroxy- and amino-azo-compounds have engaged the attention of several workers.

The colours of complex salts introduces some inorganic chemistry, whilst in the last few pages—devoted to method—spectroscopes, spectrographs, &c., are described, and an outline of the manner of working with these instruments is given.

J. T. H.

THE NON-METALLIC MINERALS OF ECONOMIC VALUE.

Die wichtigsten Lagerstätten der Nicht-Erze. By Dr. O. Stutzer. Erster Teil, Graphit, Diamant, Schwefel, Phosphat. Pp. xv+474. (Berlin: Gebrüder Borntraeger, 1911.) Price 16 marks.

THIS work is designed to supplement the treatise of Prof. Beck on "Mineral Veins and their Contents," by giving an account of the deposits of those useful mineral substances which are not classed as "ores." The first volume, now published, is evidently the fruit of a vast amount of labour and bibliographical research, and deals only with four classes of materials, to each of which the amount of space devoted is as follows—graphite, 88 pages; diamonds, 94 pages; sulphur, 81 pages; and phosphates, 198 pages. In the case of each of these materials, the author, after preliminary notices of its mineralogical characters and modes of occurrence, proceeds to compile from the most varied sources descriptions of each of the districts in which it occurs. These descriptions are illustrated by page blocks (of which there are no fewer than 108 in the volume) giving sketch maps, sections, drawings, and photographs. Very miscellaneous information is supplied in these accounts of localities, including statistics of annual yield with prices and total values, and even, in some cases, examples of forms of agreement between sellers and buyers. In the case of the South African diamond fields, however, these statistics are, unfortunately, not brought down to later date than the year 1908.

As a rule, the references to authorities are ample and satisfactory, but we notice some marked exceptions. The author's acquaintance with British scientific literature would appear to be much more limited than his knowledge of German, American, and even Japanese sources of information. Thus a section of the Upware phosphatic beds is stated to be "after W. Keeping-Penrose," and the puzzled English reader is left to find out that the information about British deposits is obtained, at second hand, from a Bulletin of the United States Geological Survey, written by Mr. R. A. F. Penrose, jun., in 1888! We are reminded of the ingenuous remark of a compatriot of the author, who, when it was pointed out to him that a research he had published had been long before anticipated in this country, said, "Ah, that was buried in the catacombs of the Royal Society's Transactions!" In like manner, we find that Mr. Teall's interesting account of the phosphatised trachyte of Clipperton Atoll, published in the Quarterly Journal of the Geological Society in 1898, is ignored, while many less interesting deposits in the Pacific are fully described.

After the discussions of the distribution and statistics of the materials in the various districts, the author proceeds to consider such general questions as their origin, artificial formation, and metamorphoses. The treatment of these more purely scientific problems, however, is quite subordinate to that of economic and statistical questions, and little of novelty or special interest is to be found in these sections of the book.

An exception to this may, perhaps, be found in the useful abstract, on pp. 254 to 262, of the views that have been put forward concerning the origin of beds of sulphur, including the possible production of some of these deposits through the agency of bacteria, like Beggiatoa and Chromatium. On the whole, however, the work is to be commended for its technological rather than its scientific value.

ELECTRICITY AND MAGNETISM.

(1) *Beispiele und Uebungen aus Elektrizität und Magnetismus.* By Prof. R. Weber. Fünfte Auflage. Pp. viii+330. (Leipzig and Berlin: B. G. Teubner, 1910.) Price 4.80 marks.

(2) *Experimentelle Elektrizitätslehre, verbunden mit einer Einführung in die Maxwellsche und die Elektronentheorie der Elektrizität und des Lichts.* By Prof. H. Starke. Zweite Auflage. Pp. xvi+662. (Leipzig and Berlin: B. G. Teubner, 1910.) Price 12 marks.

(1) THIS is a collection of nearly nine hundred examples in electricity and magnetism. They are all numerical in character, and each is completely

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